



## Fact Sheet:

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### RETROFIT LIGHTING TECHNOLOGIES

#### The Problem

Many existing buildings have outdated lighting system technology. The steady rise in the cost of electricity along with other energy and environmental issues have provided the incentive to retrofit these buildings with modern lighting systems that consume less energy. Modern energy saving retrofits can also upgrade the quality of building interiors. The transition from paper-based open offices to computer-based work stations with partitions and modular furniture increases the need for attention to measures of illumination such as brightness, glare, and contrast. Directorates of Public Works on Army installations need readily available information on selection, application, and performance of lighting retrofits.

#### The Technology

Recent advances in lighting technology have produced a variety of new lighting system components which can be retrofitted in existing buildings to provide improved performance. These new components include high efficiency light sources, more advanced luminaire designs, and lighting controls. Energy efficient components such as improved fluorescent lamps, electronic ballasts, occupancy sensors, and exit signs are gaining widespread popularity. The U.S. Army Construction Engineering Research Laboratories (CERL) is evaluating

application issues for retrofit hardware and developing guidelines to facilitate implementation of energy efficient, quality lighting in Army buildings.

### **Benefits/Savings**

The benefits from retrofitting existing lighting systems in buildings are 1) reduced electrical energy consumption and 2) improved performance of lighting systems which will facilitate productivity improvements and enhance the quality of life.

This research will lead to greater capabilities for the Army to evaluate and properly apply new lighting technology.

### **Status**

CERL co-sponsored the development of a guidebook for energy efficient lighting systems. This booklet, entitled The NLB Guidebook to Energy-Efficient Lighting Systems, was developed by and is available through the National Lighting Bureau.

CERL reports document the testing performed to answer specific questions related to fluorescent lamp/ballast performance, specular reflectors, occupancy sensors, and compact fluorescent lamps in downlights. CERL Technical Report FE-93/23, Selecting Effective Fluorescent Lamp and Ballast for Retrofit in the Continental United States, August 1993; FE-94/13, Performance of Specular Reflectors Used for Enhancement, June 1994; and 95/17, Compact Fluorescent Retrofits for Incandescent Downlight Fixtures, August 1995, are available. A lighting retrofit package has been developed for standard layout dining facilities. Also, CERL contributed to the development of Engineering Technical Letter 1110-3-441, Electronic Ballasts for Florescent Lighting Fixtures.

Three other reports entitled Evaluation of Visual Function Under Different Light Sources, Evaluation of Fort Hood Exterior Lighting, and Evaluation of PC-Based Lighting Audit Tools will be available in FY97.

CERL is surveying Army installations to determine penetration rates for energy-efficient lighting technology and identify obstacles to implementation of same. CERL is also evaluating office lighting systems for their impact on employee productivity. This work will result in illumination criteria that is more appropriate

for computer-based tasks than foot-candle measurements alone. The PC-based Energy Manager Project Assistant will enable installation staff to quickly and accurately develop 1391s and supporting documents for the most common lighting retrofits.

**Points of Contact**

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